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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10:089,435	03/29/2002	Barry Leonard Walter Chapman	604-632	6970

7590 09/23/2003

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1100 North Glebe Road 8th Floor
Arlington, VA 22201-4714

EXAMINER

DONOVAN, LINCOLN D

ART UNIT	PAPER NUMBER
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2832

DATE MAILED: 09/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/089,435

Applicant(s)

CHAPMAN, BARRY LEONARD
WALTER

Examiner

Lincoln Donovan

Art Unit

2832

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Specification

This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

Claim Objections

Claim 13 is objected to because of the following informalities: in lines 3 and 10, "ROT" should be corrected as -- ROI --. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, in line 4, applicant should clarify what structure, or step, is intended by "setting a *hypothetical* distribution of magnetic material over the surface of said structure."

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 6-8, 11-12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over McGinley et al. [US 5,532,597] in view of Glover et al. [US 5,168,232].

Regarding claims 1-4, 11-12 and 16, McGinley et al. discloses a method of designing a magnetic structure for modifying a magnetic field to generate a desired region of interest (ROI) comprising:

- setting the dimensions of the magnetic structure [column 3, lines 4-9];
- setting a "hypothetical" distribution of magnetic material over the surface of the structure based on the spatial frequency harmonics of each set [abstract];
- calculating the inhomogeneity of the magnetic field within the ROI [column 4, lines 53-65]; and
- calculating the necessary shimming using a method of least squares to achieve the optimum approximation of the desired field within the ROI.

McGinley et al. disclose the instant claimed invention except for use of permanent magnets used with the shims.

Glover et al. disclose the use of permanent magnets used in a shimming process.

It would have been obvious to a person having ordinary skill in the art at the time invention was made to use permanent magnets with the shims (if needed) for the purpose of enhancing the magnetic field.

Regarding claim 16, McGinley et al., as modified, disclose a permanent magnet structure formed using the claimed method.

Regarding claims 6-8, McGinley et al., as modified, disclose the instant claimed invention except for: the specific shape over which the magnetic field is to be distributed.

It would have been obvious to a person having ordinary skill in the art at the time invention was made to form the ROI and field shape to conform to the specific application intended for the device.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over McGinley et al. in view of Glover et al. as applied to claim 4 above, and further in view of Vermilyea [US 4,853,663].

McGinley et al., as modified, disclose the instant claimed invention except for shims being created for each harmonic.

Vermilyea discloses creating a shim set for a plurality of harmonics [column 7, line 67-column 8, line 24].

It would have been obvious to a person having ordinary skill in the art at the time invention was made to use the shim set design technique of Vermilyea for the shimming of McGinley et al., as modified, for the purpose of reducing unwanted harmonics.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over McGinley et al. in view of Glover et al. as applied to claim 7 above, and further in view of Domigan et al. [US 5,659,250] and Chapman [US 5,266,913].

McGinley et al., as modified, disclose the instant claimed invention except for the thickness of the material being varied in an azimuthal direction in accordance with the desired field.

Domigan et al. disclose varying the thickness of magnet blocks to control a magnetic field [column 5, lines 65-column 6, line 5].

It would have been obvious to a person having ordinary skill in the art at the time invention was made to vary the thickness of the shims in McGinley et al., as modified, as suggested by Domigan et al., for the purpose of further controlling the magnetic field.

Chapman discloses using the azimuthal field direction to determine a magnetic field component.

It would have been obvious to a person having ordinary skill in the art at the time invention was made to vary the shim size of McGinley, as modified, in an azimuthal direction, as suggested by Chapman, to confine the specific field generated.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over McGinley et al. in view of Glover et al. as applied to claim 1 above, and further in view of Sumanaweera et al. [US 5,351,006].

McGinley et al., as modified, disclose the instant claimed invention except for the desired field being produced by a combination of paramagnetic and diamagnetic materials.

Sumanaweera et al. disclose a correction apparatus for a mri using paramagnetic and diamagnetic materials.

It would have been obvious to a person having ordinary skill in the art at the time invention was made to use paramagnetic and diamagnetic materials for the shims of McGinley et al., as modified, for the purpose of limiting variations in the magnetic field.

Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over McGinley et al. in view of Glover et al. as applied to claim 1 above, and further in view of Chapman.

McGinley et al., as modified, disclose the instant claimed invention except for the specific calculation methods used to approximate the magnetic field necessary from the shims.

Chapman discloses the use of various calculation methods and extrapolations to compute the shimming.

It would have been obvious to a person having ordinary skill in the art at the time invention was made that various known mathematical functions and extrapolations, as suggested by Chapman, could have been used for the shimming of McGinley et al., as modified, for the purpose of computing the size and placement of the shims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Jesmanowicz et al. [US 6,294,972].

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lincoln Donovan whose telephone number is 703 308-3111. The examiner can normally be reached on M-F 8:30-5:00.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1920.

ldd
9/15/03

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LINCOLN DONOVAN
RECEIVED EXAMINER
9/15/03 2:00